

WHAT IS CLAIMED IS:

- 1 1. A system comprising:
2 an optical member positioned between an intended location of a
3 viewer and an environment of interest to said viewer, wherein a visible light
4 path from said viewer to objects in said environment has a substantially
5 unitary magnification, at least a portion of said optical member being
6 wavelength-selective with respect to reflectivity characteristics, such that said
7 optical member is generally transmissive with respect to visible light and is
8 substantially reflective with respect to a particular detection wavelength;
9 a detector for receiving light of said detection wavelength
10 reflected by said optical member from said viewer within said intended
11 location, said detector having a detector output that is responsive to said
12 received light; and
13 a processor connected to said detector for processing said
14 detector output, wherein optical properties along said visible light path from
15 said viewer to said objects remain independent of said processing.
- 1 2. The system of claim 1 wherein said optical member is a dichroic mirror
2 along said at least a portion of said optical member.
- 1 3. The system of claim 1 wherein said detector and processor are configured
2 for detection of human eyes.
- 1 4. The system of claim 3 wherein said processor is further configured to
2 correlate detection of said human eyes to stored identifications of particular
3 persons, thereby enabling said system to specifically identify said human
4 eyes.

1 5. The system of claim 1 further comprising a first light source for emitting
2 first light having said detection wavelength, said first light source being
3 directed to reflect said first light from said optical member to an anticipated
4 position of eyes of said viewer within said intended location, said detector and
5 said processor being dedicated to acquiring data that is specific to said eyes.

1 6. The system of claim 5 wherein said processor is configured to monitor
2 perceived alertness of said viewer on a basis of said data.

1 7. The system of claim 6 wherein said optical member is a windshield of a
2 motor vehicle.

1 8. The system of claim 7 wherein only a portion of said windshield has a
2 coating which provides said wavelength selectivity, said coating defining a
3 dichroic mirror within said portion, said detector and said first light source
4 being positioned out of view with respect to vision of a driver of said motor
5 vehicle through said windshield.

1 9. The system of claim 5 wherein said processor is configured to provide
2 identification of said viewer, said processor having access to a database of
3 alternative viewer identifications.

1 10. The system of claim 9 wherein said optical member is a glass divider.

1 11. The system of claim 5 further comprising a second light source for
 2 emitting second light having said detection wavelength, said second light
 3 source being directed to reflect said second light from said optical member to
 4 said anticipated position of said eyes, but at an angle that is distinguishable
 5 from an angle of said first light

1 12. A system for eye detection comprising:
 2 a dichroic mirror which is generally transparent to visible light
 3 and which reflects light having a specific wavelength range;
 4 a first light source for emitting first light to impinge said dichroic
 5 mirror such that said first light is reflected at a first illumination angle;
 6 a second light source for emitting second light to impinge said
 7 dichroic mirror such that said second light is reflected at a second illumination
 8 angle greater than said first illumination angle, said first light and said second
 9 light having substantially equal intensity within said specific wavelength range;
 10 and
 11 a detector located for receiving back-reflected light from said
 12 dichroic mirror as a consequence of reflection of said first and second light
 13 toward said dichroic mirror from a subject's eyes;
 14 wherein said subject's eyes are detectable using the difference
 15 between back-reflected said first light and back-reflected said second light.

1 13. The system of claim 12 wherein said first and second light sources are
 2 sources of infrared (IR) light, said specific wavelength range reflected by said
 3 dichroic mirror including said IR light.

1 14. The system of claim 12 wherein said dichroic mirror is a divider between
 2 anticipated positions of said subject and a second person with whom said
 3 subject is interacting, said detector and said first and second light sources
 4 being located outside any line of sight from said subject to said divider.

1 15. The system of claim 12 wherein said dichroic mirror is a region of a
2 windshield of a motor vehicle, said detector and said first and second light
3 sources being embedded within a dashboard of said motor vehicle.

1 16. The system of claim 15 further comprising a processor for receiving data
2 from said detector, said processor being configured to monitor pre-identified
3 conditions indicative of drowsiness of a driver of said motor vehicle, said
4 driver being said subject.

1 17. The system of claim 12 wherein said dichroic mirror is a limited region of
2 a windshield of a motor vehicle, said detector and said first and second light
3 sources being outside any line of sight from a driver to said windshield.

1 18. A system for a motor vehicle comprising:
2 a windshield with at least a portion having a coating which
3 defines a dichroic mirror that is generally transparent to visible light and
4 substantially reflective with respect to a driver-detection wavelength range;
5 a detector for receiving reflected light within said driver-detection
6 wavelength range following reflection from said windshield; and
7 a processor connected to said detector for determining informa-
8 tion regarding a driver of said motor vehicle on a basis of said reflected light
9 received at said detector.

1 19. The system of claim 18 wherein said detector is positioned outside any
2 line of sight from said driver to said windshield.

1 20. The system of claim 19 wherein said detector is embedded in a
2 dashboard of said motor vehicle.

1 21. The system of claim 19 further comprising a first light source for emitting
2 first light within said driver-detection wavelength range toward said defined
3 dichroic mirror, said first light source being positioned such that said emitted
4 first light is reflected toward an anticipated location of the face of said driver.

1 22. The system of claim 21 further comprising a second light source for
2 emitting second light within said driver-detection wavelength range toward
3 said defined dichroic mirror so as to illuminate said face at an angle greater
4 than illumination by said first light, wherein pupils of said driver's eyes are
5 detectable using a difference between back-reflected said first light and
6 back-reflected said second light.

1 23. The system of claim 22 wherein said first and second light sources and
2 said detector are embedded in a dashboard of said motor vehicle.

1 24. The system of claim 23 wherein said first and second light sources are
2 IR emitters.

1 25. The system of claim 18 wherein said processor is configured to monitor
2 perceived conditions of drowsiness of said driver.

1 26. The system of claim 18 wherein said processor is configured to identify a
2 specific said driver.

1 27. A method for use in a motorized vehicle comprising:
2 providing a windshield that is generally transparent with respect
3 to visible light and provides reflection of first light within a driver-detection
4 range of wavelengths;
5 providing a detector in a position to receive reflected said first
6 light from said windshield without obstructing vision through said windshield;
7 and
8 determining information regarding a driver of said motor vehicle
9 on a basis of data acquired via said detector.

1 28. The method of claim 27 further comprising directing at least one beam of
2 said first light toward said windshield for reflection onto eyes of said driver,
3 each said beam originating from a source that is located so as not to obstruct
4 vision through said windshield.

1 29. The method of claim 28 wherein directing each said beam is implemented
2 by embedding each said source in a dashboard of said motor vehicle.

1 30. The method of claim 28 wherein directing each said beam includes using
2 an infrared light source.

1 31. The method of claim 27 wherein determining said information regarding
2 said driver includes monitoring drowsiness.

1 32. The method of claim 27 wherein determining said information includes
2 identifying said driver.